A Self-Study of Technological Transition: Instructional Impacts of Shifting a Distance Course Delivery System

Susan A. Turner, Utah State University

Abstract

This self-study examines the process of technological transition: the instructional shift from the use of one distance course delivery technology, to a different technology delivery system. Specifically, it examines the impact of the shift on course design, and on the instructor's transitional learning process that occurred while moving a graduate course from distance face-to-face delivery format, to an on-line collaborative learning format using Wimba® software. The change process is documented through the use of self-study methodology (Samaras & Freese, 2006), and an exploratory framework for technological transitions of this type, is proposed. The framework focuses on four critical areas of transitional knowledge: Student Knowledge, Technical Knowledge, Experiential Knowledge and Reflective Knowledge.

Key Words: Self-Study, Virtual Teaching, Distance Technology, Multi-User Virtual Environment, Wimba®.

Introduction

A rapidly growing trend in institutions of higher education is the shift to distance course delivery, particularly for graduate level courses. Though benefits of virtual schooling have been well documented (Roblyer, M. D., & Knezek, G., 2003; Roblyer, et. al., 2009; Watson & Ryan, 2007), the actual process of making technological transitions, is an area that is in the early stages of examination.

Recently, when asked to make a technological transition, which involved converting a highly-interactive leadership training course from a distance face-to-face delivery system, to an on-line collaborative delivery system using Wimba® software[1], the process raised a number of instructional questions. I wondered how to best execute the technological transition, and how it would affect present course design. Other concerns were the amount of time the transition would take, and how student learning might be affected by the changes.

My existing course incorporated adult learning theory (Bee & Bjorkland, 2004), and included interactive learning (Vygotsky, 1997), open-ended project design, and inquiry-based processes (Valli, Van Zee, Rennert-Ariev, Mikeska, Catlett-Muhammad, & Roy, 2006). Student feedback from three previous iterations of the course confirmed the effectiveness of the use of socio-cognitive learning processes (Daloz, 1986, Valli, et. al, 2006), the importance of providing opportunities for high student engagement and interaction (Kegan, 1982), and the creation of opportunities to share virtual student presentations.

Based on these theoretical underpinnings, successful teaching strategies for my current face-to-face distance delivery course included the use of popular media clips, role-plays, group activities, threaded discussion, and team presentations. As the technology transition progressed, I was uncertain whether these strategies could or should translate to the new technology delivery

---

[1] Terms are used interchangeably in this paper to describe the technology implemented by the instructor in study. Definitions for the term are provided below:

- *Wimba®:* Trademarked name of a specific collaborative learning software.
- *On-line collaborative learning software:* Software that allows teachers and students to collaborate on-line through the use of voice, visuals, interactive signals, threaded discussion, and chat rooms.
- *Multi-user Virtual Environment (MUVE):* Multi-user virtual environment software allows real-time discussion by multi-users, and may include a 'virtual' visual of collaborators.

system. Also at issue was the potential loss of visual connection with students and a potential decrease in student/instructor engagement.

As an educator who has experienced previous technology shifts, the assignment to change the technology delivery system of a course should have been fairly uncomplicated. However, after completing an initial training session for the new course delivery system, it was apparent that this technology shift would require instructor retraining, acquisition of multi-faceted new knowledge, and deep reconstruction of the present course design.

To inform the change process (Lewin, 1951, Kotter, 1996, Meizrow, 1998) the researcher examined existing literature, with a focus on uncovering information that might provide a blueprint for a technology delivery shift of this type. The search led to well-executed studies measuring outcomes of specific distance instructional strategies (Tallent-Runnels, et. al., 2006) and the perceptions of faculty members as they approached those shifts (Shulte, 2010). An exploration of useful instructional practices for use in face-to-face and hybrid delivery courses (Toth, Amrein-Beardsley, Foulger, 2010) and evaluations of student learning outcomes in a multi-user virtual environments (Hearrington, D. 2010) provided some assurance that the technological leap could be made without a reduction in course quality or student learning outcomes.

However, though existing literature provided useful information on the current understanding of the use of distance and online teaching technologies, the researcher was unable to discover a step-by-step process that could be used inform the transitional process she was engaged in. In an effort to document and understand this process, the researcher initiated a self-study (Samaras & Freese, 2006) designed to examine the process of a technology delivery shift, and its implications for instruction. This self-study is offered to colleagues making similar transitions as a possible blueprint for such shifts, and as a contribution to the emerging dialogue about the process of engaging in technology change processes.

Purpose of the Study

The purpose of this study is to examine the process of making course technology transitions and the effect of those transitions on course design and instruction. An additional purpose of this study is to document a personal teaching inquiry and to reflect on the process of instructional change. This explorative self-study is organized around the following questions:

- *Knowledge Issues:* What Student Knowledge, Technical Knowledge, Experiential Knowledge and Reflective Knowledge are necessary and useful in the implementation of a change in a distance course delivery, from face-to-face distance technology, to collaborative on-line teaching technology?
- *Course Design Issues:* What elements of course design were useful when shifting course delivery technology from face-to-face distance, to collaborative on-line teaching technology? What new possibilities in course design emerged as a result of the implementation of new course-delivery technology?
- *Change Issues:* Can useful frameworks, processes and/or models for the incorporation of technology shifts be identified as a result of this study.

Review of Literature

An overview of recent distance education research was obtained through the review of a meta-analysis of distance education research from 2000 - 2008, in which 695 articles published by five top tier journals on distance education were analyzed. Results of the study categorized distance education research into three main categories (1) macro level research focusing on distance education systems and theories, (2) meso level research focusing on management, technology, and organization, and (3) micro level research focusing on teaching and learning in distance education. (Zawacki-Richter, Backer, & Vogt, 2009, p. 23). Within the micro level category of research, three sub-categories were identified that include: instructional design, interaction and communication within learning communities, and learner characteristics, (p. 25). This study falls in the micro level category with a focus on instructional design. Having situated this study within the larger body of distance education literature, additional literature was explored to strengthen the researcher's

background in answer to the study's questions in the areas of distance education knowledge /strategies, course design and change processes.

Strategies and Course Design

Though online and virtual teaching strategies have been discussed in distance learning literature (Benson, 2003; Tallent-Runnels, et. al,. 2006), information on the strategies, processes and knowledge required to move fluidly from one virtual format to another, are just beginning to appear in the literature (Toth, Amrein-Beardsley, Foulger, 2010). Best practices for online instructors include the incorporation of socio-constructivist learning principles (Jaffee, 2002), and challenging existing teaching practices (Thach & Murphy, 1995).

Fish & Wickersham, in a recent summary of best practices for on-line instructors suggested that instructors learn to think differently, apply adult learning theory, collaborate with colleagues, enlist student support, and focus on quality design and implementation (2009). The incorporation of socio-constructivist learning principles (Jaffee, 2002), the use of on-line communities of learners (Seels, Campbell & Talsma, 2003), and challenging existing teaching practices (Thach & Murphy, 1995) are also supported in the literature.

With the increasing use of on-line and multi-user software technologies, teaching models that incorporate the teacher as expert and main knowledge deliverer are being called into question, replaced by the understanding that teaching techniques must be adjusted to support distance education settings (Oppenheimer, 2001). Technological change taking place in the delivery of higher education courses is a reflection of global changes. Course design using distance technology is being called upon to reflect a more global view (Evans, 1995). With internet technology making broad-based collaboration and wide interaction available (Riel & Harasim, 1994) shifts in technology should allow teaching opportunities that encompass the wider group beyond the classroom and acknowledge the importance of addressing multicultural teaching realities (LeCourt, 1999).

Promising teaching strategies for use in distance education classrooms have been identified and include: problem-based learning, cognitive apprenticeships, simulations, microworlds, the use of

authentic learning activities, role-playing, reflection, scaffolding, and the promotion of multiple perspectives. Associated learning techniques that could be considered for delivery of distance technology course design include: digital audio and video, hyperlinks, synchronous and asynchronous discussions, virtual chat rooms, web posting areas, bulletin board, e-mail, search engines and online data bases (Dabbagh, 2004).

Student Outcomes and Learning Quality

The instructor's questions about whether student learning outcomes would be affected by the multi-user virtual environments was relieved by a growing body of evidence that student learning outcomes are not negatively affected by technology changes (Tallent-Runnels, et. al, 2006; Hearrington, 2010). These more recent studies reinforced the results of an earlier landmark study of 355 research reports on distance education that found "no significant difference" in student outcomes in based on the reports studied (Russell, 1999).

Research has been done on the effectiveness of various technologies used to deliver distance education and their effects on student outcomes. Since this study included transition to the use of multiple user software using both synchronous and asynchronous discourse in on-line interaction, research that explored the use of both online discourses was reviewed. Research indicated asynchronous discourse more closely resembled 'peer- to- peer' discourse (Ahearn & Alhindi, 2000), while the support of synchronous conference was also supported in the literature when used with appropriate pedagogic strategies (DeFreitas & Neumann, 2009). The importance of understanding faculty perceptions and their effects on making technology shifts were also explored (Shulte, 2010). Results indicated that faculty perceptions were important factors to consider, and confirmed that technology shifts could be made without adverse outcomes to students.

Though online and virtual teaching strategies have been discussed in distance learning literature (Benson, 2003; Tallent-Runnels, et. al,. 2006), information on the strategies, processes and knowledge required to move fluidly from one virtual format to another, are just beginning to appear in the literature (Toth, Amrein-Beardsley, Foulger, 2010). These studies informed my research, but left unanswered questions about how a technology transition takes place and what

processes, knowledge, and resources might be important in this change process.

Change Processes

Since this self-study was an exploration of the change process as it related to technology transition, literature on change processes also informed this study. Lewin's classic, three step model of change (1951), consisting of (1) unfreezing, or being willing to change, (2) making the change, and (3) re-freezing, or settling into the new change, was useful in helping to situate the instructor's progress as she moved through the change process. The insight that once a change takes place, there is the likelihood of 'freezing' again into the new mode of change was a cautionary insight into the transitory nature of change. Clark's model of incremental change underscored the necessity of organizing the change into small, doable steps. The understanding that the change was assigned, not chosen, provided useful insights into my own resistance as I undertook this change process (Clark, 1984). The change process also required an understanding of my existing mental model or cognitive frame as it related to the use of distance technology (Senge, 1990; Senge, Roberts, Ross, Smith, & Kleiner, 1994) and an awareness of how existing models and beliefs influenced course redesign and other change processes.

The change process in this study was originally viewed by the instructor as first order change (Boyce, 2003; Argyris, 1990, 1999; Argyris & Shon, 1996), or change involving what already exists or is known; change that involves the refinement of existing practices without questioning underlying values or assumption within the existing system. As the study progressed, the instructor experienced second order change, or transformational and enduring change, as a result of reflective inquiry, and incremental shifts in underlying beliefs and assumptions. Unfreezing of previous perspectives caused by the necessary grappling with new technology delivery capacities, required theoretical changes of action shaped by the underlying shifts, moving this process to second order change (Argyris, 1990, 1999; Argyris & Shon, 1996) and resulting in my own small experience of transformational learning (Meizrow, 1998).

Self Study Frameworks

The study also required an exploration of literatures describing appropriate self-study methodologies. The use of reflective practice (Cole & Knowles, 2000, Ferdig, 1998) and self-study

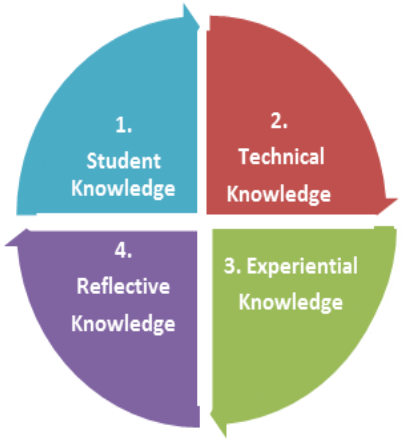
methodologies (Samaras & Freese, 2006) provided useful frameworks for instructor exploration and reflection. Qualitative analysis (Bogdan & Bilken, 1998; Charmaz, 2006) and meaning-making from lived experience (Schwandt, 1994) also informed the methodology of this study. Constructivist assumptions (Denzin & Lincoln, 1995) that the researcher would construct and document a unique learning experience provided the ontological framework for the study.

Methodology

Self-study methodology (Samaras & Freese, 2006) used in this study was informed the by five central characteristics summarized in *Self Study of Teaching Practices.* It involved (1) *elements of situated inquiry* because it was situated within the context of a specific technology transition. It was (2) *motivated by questions from my unique context*, and (3) required an examination of *process and knowledge,* that was specific to my unique situation. This examination (4) *initiated a change journey which incorporated multiple theoretical stances and methods,* and required (5) *data collection* that was specific to this course transition. The study examined various forms of *process and knowledge* relating to the research questions. Relevant *data was gathered* using a *variety of methods* and was organized into the following categories in an attempt to answer the research questions: Student Knowledge, Technical Knowledge, Experiential Knowledge and Reflective Knowledge.

The four categories were identified by the instructor, as a way to organize this exploration and are based on identified categories of information and/or data, that were needed in order to make this transition: *Student Knowledge*: Knowledge known by students who had taken courses delivered by distance technology. *Technical Knowledge:* Knowledge known by technology experts and instructional designers. *Experiential Knowledge:* Knowledge known instructors with experience using virtual multi-user technology. *Reflective Knowledge*: Knowledge known by the researcher and reflected upon during the change process.

FIGURE 1: Self-study Exploration Categories:



Student Knowledge

Student input was gathered to inform instructor understanding in three areas relating to the study questions: knowledge, course design, and change issues. An on-line survey was completed by two master's cohorts (44 students, ages 28 - 57) who had previously taken the course undergoing the technology shift. Survey questions focused on documenting student experience and preferences relating to course delivery technology, and on their comfort levels with the use of distance technologies. In an open-ended portion of the survey, students were also asked to identify preferred instructional strategies related to virtual multi-user delivery systems. Additional student input was gathered through in-depth participant interviews with two previous course members with high levels of technological and instructional design expertise.

Technical Knowledge

Technical knowledge was gathered by the instructor through an initial four-hour training course in the use of Wimba® software. An additional six hours of individual tutoring by a campus technology consultant was completed, for a total of ten initial hours of individualized training. During the process of course re-design, two instructional designers, with expertise in course design and relevant course-delivery technologies provided ongoing input and consulting services that facilitated the change process. Two additional instructional designers from the on-campus FACT (Faculty Assisted Computer Training) Center, provided on-going consulting services throughout the two semester conversion. Reflective notes were taken by the instructor during this training process.

Experiential Knowledge

Experiential knowledge, known by colleagues who had previous experience the technological transition discussed in this article, was gathered through on-line interviews with four colleagues and six classroom observations of classroom instructors using Wimba® software to delivery their courses. The on-line interview questions focused on the identification of useful teaching strategies and instructional skills. It also asked for implementation suggestions, based on their previous experience. Interview data and instructor's notes from the class observations were coded (Charmaz, 2006) and themes identified.

Reflective Knowledge

Inquiry and personal reflection (Richardson, 1994) were used by the instructor to examine the process of technological course delivery shift. A researcher's journal was used to record the instructor's experiences and thoughts as she engaged in this change process over the period of two semesters. Narrative notes were coded (Charmaz, 2006) and recurring themes identified. In addition, knowledge gathered from colleagues, personal inquiry, students, training, and technology specialists was reflected on and processed by the researcher to draw meaningful understandings and connections (Schwandt, 1994). By drawing on lived experience and making connections between old and new knowledge (Vygotsky, 1997, Kegan, 1982), the gathered information was used inform the re-conceptualization of course design to fit the new virtual, multi-user technology.

Figure 2: Summary of Self-Study Data Gathered:

Student Knowledge	Technical Knowledge	Experiential Knowledge	Reflective Knowledge
On-line Survey (55)	Instructor Training: 10 hours + on-going practice	On-line Interviews with Experienced Wimba® Teachers (4)	Inquiry and Personal Reflective Notes on Transition Process.
Open-ended Questions (55)	Technology Consulting in Instructional Design	Classroom Observations of Wimba® Teachers (6)	Reflective Processing of information from students and colleagues.
In-Depth Interviews (2)	Technology Consulting in Technology Applications Reflective Notes by Instructor documenting on-going learning during training.		

Researcher Frameworks and Perspectives

A self-study framework (Samaras & Freese, 2006), qualitative data analysis (Bogdan & Bilken, 1998; Charmaz, 2006), reflection, and meaning-making from lived experience (Schwandt, 1994), informed this study. The instructor's grounding in teaching and learning research (Darling-Hammond, 1999), cognitive modeling (Vygotsky, 1997), adult learning models (Bee, & Bjorkland, 2004, Glickman, 2009), and previous experience with distance delivery technology implementation, also shaped this inquiry. Ontological views underpinning this study were constructivist (Lincoln & Guba, 1985; Denzin & Lincoln, 2005) and were based on the assumption that information gained through this study would be used to develop new course design, and to re-consider all elements of the existing course as the course was re-designed to fit the capacities of the virtual multi-user technology.

Personal background of the researcher includes 20 years of experience coaching and teaching adults, as a professor and former public school administrator. The researcher is classified as a technology 'immigrant', whose technology implementation experience began not in babyhood, but in her young adulthood. Since her first technology implementations in the mid-1980s, she has experienced multiple technology shifts. Positive outcomes from previous technology shifts, and a high level of comfort using face-to-face distance technology, were also factors that influenced this study (Shulte, 2010).

Figure 3: Summary of Researcher Frameworks and Perspectives:

Epistemology	Theoretical Perspectives	Methodology	Methods
Constructivism	Change Processes	Self-Study	On-line Survey
	Teaching and Learning Research	Reflective Inquiry	Open-ended and In-Depth Survey
	Adult Learning Models		Classroom Observation
	Distance Learning		Reflective Journaling

Study Outcomes

Instructor Knowledge

Instructor knowledge themes were drawn from the researcher's journal kept during the six month period of technology shift implementation, using narrative coding processes (Charmaz, 2006). Emerging themes in the area of instructor knowledge included (1) *Attitude:* instructor's attitudes toward technology shifts, (2) *Training*: the importance of appropriate training and coaching, and (3) *Time*: extensive development time was required.

The instructor's resistance to change was a surprising element that emerged from this study. As an instructor who had made previous technology leaps, I viewed myself as being open to change and skilled at implementing new technologies. Reflections and notes documenting this shift indicated strong resistance and a negative perception of the shifts on my part. Reasons listed in the researcher's journal included a potential loss of successful strategies from previous course, and the perceived loss of student and instructor engagement.

After a meeting, early in the change process, in which I was informed that the technology delivery format for this course would shift, I wrote: *"One of my major concerns about the on-going shift in course technology delivery at this time lies in the area of instructor and student relationships and student learning engagement. I don't want to lose the opportunity to see my students face-to-face, to have frequent and meaningful class discussions, and to allow students to role play, interact, and problem solve together. I'm not sure I can accomplish my teaching goals using Wimba® technology."*

Six months later, my notes included the following passage: *"Today, in my one-on-one tutoring session, I explored aspects of Wimba® technology that may allow students to more easily engage in class discussions and role plays than in the previously used face-to-face distance technology. Individual chat rooms may provide a better, less distracting way for small groups to interact. I also see that this technology makes it easier to see which students are waiting to be called on, and it allows on-going commentary by students, which is immediately visible to the instructor. Though it will be hard for me to give up the use of short video clips, I can post links that would*

allow students to view YouTube clips and/or access other websites, or ask students to link to those sites as part of their course assignments. This was an 'aha' moment for me."

The use of a reflective journal during this transition period provided useful instructional insights. My comfort level with the technology shift increased as my experiential knowledge increased. I also found the process of writing and reflecting useful in mitigating personal stress and in processing concerns about potential negative effects of this change on student learning.

Student Knowledge

Instructor concerns that shifts in course delivery technology might negatively impact student learning, led to the design of the following survey which gathered information on student technology and instructional preferences, and their previous experience with distance and virtual technology. The survey was completed by two master's cohorts of previous leadership course members (44 students, ranging in age from 28 - 57). See the following outcome summary:

Figure 4: Student Survey Part A

Student Survey Part A:			
1. I have taken the following number of Wimba® courses:	None **9.1% (4/44)**	1-3 Classes **25% (11/44)**	3+ Classes **65.9% (29/44)**
2. During the Wimba® Course I experienced:	No Technological Disruptions **43.2% (19/44)**	Occasional Disruptions **56.8% (25/44)**	Frequent Disruptions **0.0% (0/44)**
3. Compared to Distance Face-to-Face, Delivery of Wimba® information was:	More Convenient **90.9% (40/44)**	Less Convenient **0.0% (0/44)**	No Difference **9.1% (4/44)**
4. Compared to Distance Face-to-Face, my learning engagement with Wimba® delivery was:	Higher **54.5% (24/44)**	Lower **45.5% (20/44)**	No Difference **0.0% (0/44)**
5. Compared to Distance Face-to-Face, my Wimba® group interaction opportunities were:	Higher **54.5% (24/44)**	Lower **45.5% (20/44)**	No Difference **0.0% (0/44)**
6. I prefer the following form of course delivery:	Live **29.5% (13/44)**	Distance-Face-to Face **6.9% (3/44)**	Wimba® **63.6% (28/44)**

Student Feedback

Of interest to me as an instructor was the relatively high level of student experience in the use of distance and virtual delivery technology. I was also surprised and encouraged by high levels of

preference for virtual multi-user technology over distance face-to-face technology. An unexpected outcome of this survey was that surprising number of students (29.5% of those surveyed) expressed a preference for live delivery over distance delivery. One student said, *"I would prefer to interact with the professor and peers face-to-face."* Another said, *"Human interaction that occurs in a live session was missing, however with a mix of live and Wimba®, I found that I could build relationships that were very beneficial."*

Virtual multi-user benefits described by students in open-ended survey questions included: not having to travel to class, not having to arrange child care, having an on-going flow of communication and engagement, and having archived sessions available for future reference.

Open-Ended Student Feedback

Student responses on this portion of the on-line survey were summarized. Themes and representative student comments are included below:

Figure 5: Student Survey Part B:

Student Survey Part B:
1. Please describe any benefits of Wimba® course delivery you experienced.
2. Please describe any drawbacks of Wimba® course delivery you experienced.
3. Please describe any specific teaching strategies used by your Wimba® course instructor that were helpful to you.
4. Please share any specific ideas you have about how to improve Wimba® Course Delivery.
5. Please share any other comments, suggestions, etc. concerning Face-to-Face and/or Wimba® Course Delivery.

Virtual multi-user benefits described by students in open-ended survey questions included: not having to travel to class, not having to arrange child care, having an on-going flow of communication and engagement, and having archived sessions available for future reference.

On-line open-ended questions yielded the following important strands for course success: The importance of student and instructor training, appreciation for archived sessions to review when absences were necessary, and the power of random chat rooms and on-going discussion board in facilitating student learning.

Teaching strategies described as most useful from the student's perspective included: leaving the camera on so the instructor could be seen, using chat rooms for break out discussion groups, the use of engaging, student-directed threaded discussions, allowing only short, high-quality student presentations, and being well-trained and fluent in Wimba® course delivery technology, before the course began.

In-Depth Student Interviews

During initial phases of the course re-design, I conducted two in-depth interviews using the questions shown in Fig. 4, with students having a high level of both technological expertise and Wimba® experience (3+ courses). They identified the three key issues: (1) the importance of high student engagement, (Darling-Hammond, 1999) (2) the importance of exploring synchronous and asynchronous discussion formats, with and without facilitation (Ahearn & Alhindi, 2000), and (3) concerns about the lack of visuality and on-going feedback between teacher and students.

From the experienced student perspective, virtual multi-user instruction was more effective when: the instructor was visible on camera, when they thoughtfully used a combination of on-line discussion formats, and did the majority of presenting, because students observed their colleagues sometimes did not attend well during student presentations. In-depth student interviews also provided direction for improving 'threaded discussion' strategies by: reducing discussion groups to no more than eight students per group, selecting engaging and even controversial topics of discussion, and assigning student leaders to monitor each of the subgroups.

The interviews also yielded themes similar to those drawn from on-line open-ended survey questions and included: (1) the importance of student and instructor training, (2) appreciation for archived sessions, and (3) the usefulness of random chat rooms and on-going discussion board in facilitating student learning.

Technical Knowledge

Instructor's time

This section included an instructor's record of actual time spent gathering technical knowledge needed, which included: (1) Professional Development hours necessary to use the new technology = 10 hours. Instructor training processes included a half-day initial training session, four individual sessions with a technology trainer. (2) Time spent practicing and implementing the new skills, which included self-study time using on-line tutorial materials = 24 hours. (3) Course re-design time specific to the technology shift = 50 hours. (4) Observation of other instructor's Wimba® courses = 6 hours. Approximate total time invested: 80 hours.

Because gathering technical knowledge is an individual process, is affected by the instructor's existing knowledge and background, and may be affected by their perceptions (Shulte, 2010), time needed to make technological transitions will likely vary by individual. Though my previous knowledge level was fairly high, necessary learning time and effort was intensive. My personal learning style was best served by a combination of group and individual coaching sessions, observation of virtual multi-user courses, and private skill practice and on-line tutoring.

Technical expertise was also needed during the initial sessions of Wimba® course implementation. In my case, a technology coach was present to provide technological support and remained on-call during class time to solve technology glitches during the first month of the course. Student technical experience was also an important factor in successful implementation.

During the classes I observed, time was required to make sure all students were connected to the virtual user technology and to solve technical problems. During my observation of an initial Wimba® class taught by a colleague, more than an hour of class time was spent getting everyone on-line. The student survey had previously indicated that once student connection issues were solved, disruptions during class time were fairly minimal. As I taught my own initial Wimba® course, the incidence of technical problems was minimal. Having a technology expert available to trouble-shoot reduced the loss of course time.

Transitional implementation time

Personal observations of colleagues' classes and experience of my own initial forays into Wimba® instruction raised questions about quality instruction, and I noted that there were trade-offs in the use of virtual multi-user technology that exchanged 'ease of access' for 'fluent and timely course delivery'. Even with excellent equipment, strong technological support and technologically savvy students, there was transitional implementation time when distance technology is used, that was not present in a live class. Student use of quality microphones, speakers, cameras and current computer hardware were also important factors in facilitating network connection and ease of communication during the course.

Lived Knowledge

This self-study drew on the lived-knowledge of four course instructors who had experience with multi-user technology. An on-line survey and live conversations with these colleagues were summarized and common strands relating to technological use and course design were identified.

Technological use

A summary of technological implementation suggestions included: (1) Wimba® has some complex features. At the beginning, keep it simple. (2) Check your documents before class. Make sure they are loaded in the proper sections and easily accessible. (3) Be transparent. "Don't be afraid to say, give me a second to do this, then I will get back to you." (4) Using two monitors is helpful if you are using multiple documents. (5) Request that students use a headset for better sound. (6) Cameras use was preferred by some instructors and was not important to others. (7) Practice using Wimba® features before class. (8) Let the strengths and weaknesses of the delivery system shape your course design. (9) Consider accomplishing teaching goals with parallel activities available in Wimba®. (10) Make all materials for class available through Blackboard prior to class. (11) Log in 15 minutes early. (12) Remember that technology can be a barrier or tool, depending on your attitude.

Course redesign realities

It is important, as a course is reconstructed to (1) articulate goals, (2) re-think curriculum goals and strategies in light of the capacities of evolving technology, (3) experiment (4) make

decisions, and (5) create the necessary artifacts, materials, etc., to teach the redesigned course. Steps involved in making the shift included: training, consulting with more experienced implementers, re-designing curriculum goals and strategies in light of the capacities of evolving technology, creating new course materials, and experimenting in real life.

Implications of the Study

- *Course Re-Design:* Making a shift from distance-face-to-face to virtual multi-user technology required extensive changes in course design, structure, delivery, strategies and content .
- *Course Design Improvement Opportunities:* The shift to virtual multi-user delivery provided opportunities for increased capacity for in-depth course discussion, better instructor knowledge of student response levels, and provided opportunity for on-going written commentary that was unavailable in face-to-face distance technology.
- *Course Design Shifts:* Present technology levels in virtual multi-user delivery systems no longer facilitate the use of video clips, YouTube (because of firewalls in some delivery sites), and live role plays. The shift to virtual multi-user delivery also affected the visibility and on-going engagement with students. Document retrieval was slower. A several-second delay in sound delivery still persists and multiple screen shifts were unwieldy. Currently, virtual multi-user delivery systems are being updated and these issues may be allayed in the future.
- *Change Process:* The process of change takes time, thought, expertise, energy and resources. Instructional attitudes may affect technological implementation. To bring about in-depth second-order change (Argyris, 2000; 2009), an examination of instructional beliefs and attitudes may be necessary. Self-reflection may be a useful tool in this process (Cole & Knowles, 2000).
- *Importance of Lived Knowledge:* Specific knowledge about how to negotiate technology transitions is known by students, instructors, and instructional designers who have experienced them. Documenting this process and drawing on the experience and expertise of others, an example of socio-cultural learning (Vygotsky, 1997), provided a useful approach that facilitated instructor learning during this transition.

Educational Applications

This study provided a documented experiential model for the transition from face-to-face distance, to virtual multi-user course delivery technology as it was accomplished in a graduate course in educational leadership by one instructor. Important in this process was the implementation of thoughtful course redesign processes, the use of a framework of four self-study exploration categories: *Instructor Knowledge, Student Knowledge, Technical Knowledge and Lived Knowledge.*

Other important understandings that arose for the researcher in this study included: the importance of deeply understanding the potential capacities of the technology, the importance of training in the use of the technology, the importance of including inquiry and reflection in the change process, and the importance of collaboration with students, colleagues, and other experienced technicians.

Ongoing changes in course-delivery technology required a reinvention of educational processes. As a result of this self-study, the instructor found that course re-design is possible, but that teaching strategies may be boundaried by the specifications of course delivery technology. She also found that her own personal boundaries, and 're-freezing' of old perceptions (Lewin, 1951) once a transition was complete, may have created unnatural limits in teaching and course delivery. Such limits need to be examined and transcended. Instructor decision-making and boundary transcendence, lie at the heart of cutting-edge instructional re-design that is currently taking place in public schools and universities all over the world. In this self-study, there were costs and benefits as a result of technological transition. These must also be considered as instructional decisions are made.

From an instructor's perspective, the training, time, and resources, required to make a shift from one technology to another, were substantial. The perusal of literature and the use of interactive collegial and student/instructor learning, were important supports of this shift.

Lived and technological experience and training were also required. This self-study also highlights the possibility that there is benefit in documenting the processes included in technological shifts.

Two final thoughts to consider as instructional technology evolves: first, as educators, it remains important that we continue to consider the broad implications of technical shifts, and that we continue to research their influence on student learning and achievement outcomes. Second, is the importance of considered thoughtfulness about long-term implications of the increasing substitution of virtual technology, for real-life interactions. While there are benefits to the use of these technologies, there are also costs that must be considered and wisely mitigated. It's an important conversation we must all continue to engage in.

References

Ahern, T. C., Y El-Hindi, A. E. (2000). Improving the instructional congruency of a computer-mediated small-group discussion: A case study in design and delivery. *Journal of Research on Computing in Education, 32* (3), 385 - 400.

Argyris, C. (1990). *Overcoming organizational defenses: Facilitating organizational learning.* Englewood Cliffs, NJ: Prentice Hall.

Argyris, C. (1999). *On organizational learning* (2nd ed.) Malden, England: Blackwell.

Argyris, C., & Schon, D. (1996). *Organizational learning II: Theory, method, and practice.* Reading, PA: Addison-Wesley.

Benson, A. (2003). Dimensions of quality in online degree programs. *American Journal of Distance Education, 17* (3), 145 - 159.

Bee, H. L., and Bjorklund, B. R. (2004). *The journey of adulthood.* (5th ed.). Upper Saddle River, N. J.: Prentice Hall.

Bogdan, R. C., & Biklen, S. K. (1998). *Qualitative research in education; An introduction to theory and methods* (3rd ed.). Boston: Allyn & Bacon.

Boyce, Mary E. (Winter 2003). Organizational learning is essential to achieving and sustaining change in higher education. *Innovative Higher Education. 28* (2), 119 - 36.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis.* Thousand Oaks, CA: Sage Publications.

Clark, B. R. (1984). The organizational conception. In B. R. Clark (Ed.), *Perspectives on higher education.* Berkeley, CA: University of California Press, 106 - 131.

Cole, A. L., & Knowles, J. G. (2000). *Researching teaching: Exploring teacher development through reflexive inquiry.* Boston: Allyn and Bacon.

Dabbagh, Nada. (2004). Distance learning: Emerging pedagogical issues and learning designs. *The Quarterly Review of Distance Education. 5* (1), 37 - 49.

Darling-Hammond (1999). Educating teachers for the next century: Rethinking practice and policy. In G. Griffin (Ed.), *The education of teachers: 98th NSSE yearbook, Part 1* (pp. 221–256). Chicago: NSSE.

Daloz, L. A. (1986). *Effective teaching and mentoring.* San Francisco: Jossey-Bass.

De Freitas, Sara, Neumann, Tim. (2009). Pedagogic strategies supporting the use of synchronous audiographic conference: A review of the literature. *British Journal of Educational Technology. 40* (6), 980-998.

Denzin, N. K., & Lincoln, Y. S. (2005). *Handbook of Qualitative Research.* Thousand Oaks, CA: Sage.

Evans, T. (1995). Globalization, post-Fordism and open and distance education. *Distance Education, 16* (2).

Ferdig, R. (1998). Teaching a teacher about technology: A narrative approach. In McNeil, S., Price, J. D., Boger-Mehall, S., Robin, B., & Willis, J. (Eds.) *1998 Information Technology and Teacher Education Annual: Proceedings of SITE98, 738740.* Charlottesville, VA: Association for the Advancement of Computing in Education (AACE).

Fish, Wade W., Wickersham, Leah W. (2009). Best practices for online instructors: reminders. *The Quarterly Review of Distance Education. 10* (3), 279-284.

Glickman, C. D., Gordon, S. P., Ross-Gordon, J. M. (2009). *The basic guide to supervision and instructional leadership.* Boston, New York, San Francisco: Allyn and Bacon/ Pearson.

Hearrington, D. (2010). Evaluation of learning efficiency and efficacy in a multi-user virtual environment. *Journal of Digital Learning in Teacher Education. 27* (2), 65 - 75.

Jaffee, D. (2002). Virtual transformation: Web-based technology and pedagogical change. ITFORUM paper #58.

LeCourt, D. (1999), The ideological consequences of technology and education: The case for critical pedagogy. In M. Selinger & J. Pearson (Eds.), *Telematics in education: Trends and issues.* Kildington, Oxford, UK: Pergamon.

Lewin, K. (1951). *Field theory in social science.* New York: Harper and Row.

Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publishers.

Kegan, R. (1982). *The evolving self: Problem and process in human development.* Cambridge, MA: Harvard University Press.

Kotter, J. P. (1996). *Leading change.* Boston: Harvard Business School Press.

Meizrow, Jack (Spring 1998). On critical reflection. *Adult Education Quarterly. 48* (3), 185 - 98.

Oppenheimer, Robert J. (Summer, 2001). Increasing student motivation and facilitating learning. *College Teaching. 49* (3), 96 - 98.

Richardson, L. (1994). Writing: A method of inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 516–529). Thousand Oaks, CA: Sage Publications.

Riel, M., & Harasim, L. (1994). Research perspectives on network learning. *Journal of Machine-Mediated Learning. 4* (2 & 3), 91 - 114.

Roblyer, M. D., & Knezek, G. (2003). New millennium research for educational technology: A call for a national research agenda. *Journal of Research on Technology in Education, 36* (1), 61 - 72.

Roblyer, M. D., Porter, M. Bielefeldt, T., Donaldson, M. B., (Summer 2009). "Teaching online made me a better teacher": Studying the impact of virtual course experiences on teachers' face-to-face practice. *Journal of Computing in Teacher Education, 25* (4), 121 - 126.

Samaras, A. P., & Freese, A. R. (2006). *Self-study of teaching practices: Primer.* New York: Peter Lang.

Schwandt, T. A. (1994). Constructivist, interpretivist approaches to human inquiry. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 118–137). Thousand Oaks, CA: Sage Publications.

Seels, Barbara, Campbell, Shirley, Talsma, Valerie, (2003). Supporting excellence in technology through communities of learners. *Educational Technology Research Development. 51* (1), 91 - 104.

Senge, P. (1990). *The fifth discipline: The art and practice of the learning organization.* New York, NY: Doubleday.

Senge, P., Kleiner, A., Roberts, C., Ross, R., Roth, G., & Smith, B. (1999) *The dance of change: The challenges to sustaining momentum in learning organizations.* New York, NY: Doubleday.

Shulte, Marthann. (2011). The foundations of technology distance education: A review of the literature to 2001. *The Journal of Continuing Higher Education. 59,* 34-44.

Shulte, Marthann. (July 2010). Faculty perceptions of technology distance education transactions: Qualitative outcomes to inform teaching practices. *The Journal of Educators Online, 10* (2), 1 - 21.

Tallent-Runnels, M., Thomas, J., Lan, W., Cooper, S., Ahern, T., Shaw, S., & Lui, S. (2006). Teaching courses online: A review of the research. *Review of Educational Research, 76* (1), 93 - 135.

Thach, E. C. Y Murphy, K. L. (1995). Competencies for distance education professionals. *Educational Technology Research & Development, 43* (1), 57 - 79 *(*cited by Dabbach, quoted in this article).

Tooth, M. J., Amrein-Beardsley, A., Foulger, T. S. (September 2010). Changing delivery methods, changing practices: Exploring instructional practices in face-to-face and hybrid courses. *MERLOT Journal of Online Learning and Teaching, 6* (3), 617 - 633.

Valli, L., VanZee, E. H. Rennert-Ariev, P., Mikeska, J. Catlett-Muhammad, S., & Roy, P. (Summer 2006). Initiating and sustaining a culture of inquiry in a teacher leadership program. *Teacher Education Quarterly, 33* (3), 97 - 114.

Vygotsky, L. S., (1997). *Educational psychology.* Boca Raton, FL: St. Lucie Press. Watson, J., & Ryan, J. (2007). *Keeping pace with K-12 online learning: A review of state-level policy and practices.* Retrieved May 4, 2010, http://www.nacol.org/dosc/KeepingPace07-color.pdf.

Zawacki-Richter, Olaf, Backer, Eva Maria, Vogt, Sebastian (2009). Review of distance education research (2000 to 2008): Analysis of research areas, methods, and authorship patterns. *International Review of Research in Open and Distance Learning. 10* (6), 30 p.